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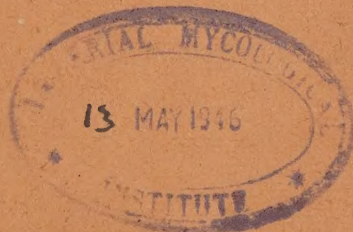
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THE PRESENCE IN ITALY OF *FUSARIUM MONILIFORME* ON RICE AND ITS PHYTOPATHOLOGICAL SIGNIFICATION *

As is known, no signification, from the phytopathological standpoint, can be attributed to the criterion of mycological reports. On the contrary, phytopathology requires a series, if possible fairly long, of experimental and geographical data. With this fact in mind, we maintained the greatest reserve as regards the reporting, by ELISER, and too hurriedly considered as new, of *Fusarium moniliforme* Sheld. on rice in Italy, as well as regards the deductions relative to the existence of a disease as serious as that caused by this fungus in tropical and subtropical zones. Since 1940, we have studied most carefully, in the open and in the laboratory, the Italian strains of this species and we are in a position to indicate some of the most interesting conclusions attained.

The work *in extenso* will be published in the 'Atti' of the Botanical Institute and Cryptogamic Laboratory at Pavia.

Hereunder are the conclusions of our investigations :—

(1) It ensues that this fungus was already reported in Italy on rice by CATTANEO in 1877 under the name of *F. heterosporum* Nees. It is to be noted that also in Japan where this fungus has long been studied, this incorrect name was maintained until 1931.

(2) A phytogeographic examination shows the fungus present in all the rice-growing zones and, in a more general way, in all the cultivated zones of the temperate region. This fungus is present or probably present, not only on rice, but also on at least 23 species of Phanerogams, of which 6 in Europe (sorghum, castor oil plant, *Succisa*, clover, maize, wheat). Three of these host-plants (sorghum, maize, *Ricinus*) are in their turn reported in Italy as being susceptible to attack by this same fungus ; moreover, the fungus is also found on parts of plants in storage.

(3) From the standpoint of rice pathology, it has been observed that the disorders attributed to *F. moniliforme* are not always constant nor well defined and they seem to depend on climate and conditions governing cultivation of the plants. At least three distinct diseases have been attributed to this parasite.

* Note from Professor Elio BALDACCI, Sub-Director of the Italian Cryptogamic Laboratory, Pavia, Italy.

One in Japan (bakanae), another in India (collar rot) and the third in British Guiana (man rice). Two other unspecified diseases have been reported in the Philippines and in Arkansas, U.S.A.

The disorders observed in Italy only come slightly within the pathogenic compass of collar rot disease.

(4) The spread of the fungus in Italy and its incidence, in the disease, are low: only 1 per cent. of the plants affected in the rice-fields, while in Japan, 59 per cent. of the plants are attacked in the first stage of growth. In Japan, frequently 20 per cent. of the crop is lost through the damage caused.

With experimental infection, the pathogenic action of Italian strains appears average, under the same working conditions and same technique adopted by the scientists of the Far East (determination of the greatest lengthening of seedlings). The strains of localities of Japan, the Netherlands Indies and India have a very marked pathogenic action. It should also be noted that this fungus presents an appreciable variability as regards pathogenic action and that numerous strains are distinguished by this characteristic.

(5) Of the external factors which influence the development of the disease, temperature was examined first. According to experimental investigations, the optimum temperature for infection is 35°C. The temperature only very rarely reaches this degree during the vegetative period of rice in the rice-growing zones of Vercelli and Pavia. The average temperature during this period and the maximum during the successive periods (flowering, ripening) never attain this optimum value. Compared with the Japanese localities where the disease is rampant, it is seen that the Italian summer is shorter and that the average temperatures are lower during the months of July and August and particularly in September. Consequently, during the flowering season and more especially during the time of grain ripening, the thermic conditions which favour infection through the flowers or the grain are wanting.

(6) No difference in morphological and cultural characteristics is observed between the Italian and tropical strains. On the contrary, in Italy, the absence of the perfect form (*Gibberella fujikuroi* (Saw.) Wr.) on the plants is noted.

In our cultures on agar-agar, we only found perithecial rudiments once. The absence of this stage may adversely affect the formation of strains with a high pathogenic power, and may explain, together with what has already been said, the different behaviour of the parasite in Italy, since it is well known that strains with a different physiological and physiopathological activity may be produced as a result of fecundation phenomena.

The presence of this fungus for some time in Italy and its slight influence, together with its extensive phytogeographic distribution, its many host plants, and the different pathological manifestations on rice, lead us to conclude that the pathogenetic behaviour depends on special conditions of climate and cultivation which are not found or which have not yet been found in Italy.

ESTIMATION OF TOXICITY BY THE TOXICITY CURVE METHOD ACCORDING TO PRIGGE AND SCHAEFER *

The problem of estimating the fungicidal power of a compound and of comparing this power in different preparations was tackled for the first time by MCCALLAN and WILCOXON (1932), on the basis of the comparison between the germination percentages of spores subjected to the action of two different preparations. This comparison was made using suitable statistical methods, such as the χ^2 method of PEARSON, generally employed in biometry, as it was supposed that there was a binomial distribution of germination percentages.

Six years later, the same investigators (1938) adopted a simplified form of the BLISS method (1935) which was based on estimating the value of the dose killing or inhibiting 50 per cent. of the spores, *i.e.*, the median lethal dose, abbreviated to LD50.

These points cleared up, the following questions will be treated :—

- (1) Interpretation of the toxicity curve and method of correction ;
- (2) Toxicity curve fitting and importance of each observation ; use of graph methods ;
- (3) LD50 error and correction of random sampling errors ;
- (4) Case of non-rectifiable curves : theoretical signification and elaboration in the practical field.

INTERPRETATION OF THE TOXICITY CURVE AND METHOD OF CORRECTION.

The toxicity curve is that of a biological preparation expressed as percentage of individuals treated which give proof of a 'reaction' to the preparation, on applying the treatment with increasing doses suitably selected. By 'reaction' is understood an alternative reaction, a response so to say 'all or nothing', for example, death or survival, and in the case of fungus spores, germination or non-germination. The sigmoid form is, as is known, the characteristic of this curve.

It is known that in each biological population the degree of any characteristic varies appreciably. Take for example, the distribution of height in a human population : these distributions of biological variabilities often have a form which can be plotted to the curve of errors, or the curve of Gauss or normal curve. In this

* Communication from Professors R. CIFERRI and L. CAVALLI, Investigation Centre for Fungicides, attached to the Cryptogamic Laboratory, University, Pavia, Italy.

curve are indicated: in abscissa, the biological variability (height) or intensity of the character; and in the ordinate, the percentage or frequency of individuals of the population who present the character in question with a certain intensity indicated by the abscissa.

It must be admitted that also the resistance (or reciprocally the susceptibility) to a medicament or to a poison presents often important individual variations in a population. The simplest signification which can be given to the toxicity curve is precisely that of representing the frequency distribution of individual resistance to the product in question. It should be noted at once, however, that there is an important positive difference in regard to the distribution curve of other characters, like height in the preceding example. The toxicity curve interpreted as distribution curve of individual resistances to the product is, in effect, an integrated distribution curve ('graduation curve' in statistical texts). By inoculating a certain dose of a product into a group of animals we determine, in effect, what is the fraction of those which react to the product, namely, what is the frequency with which the inoculated dose exceeds the threshold of individual susceptibility. If we wish to know, by a positive analogy with the preceding example (which is that of biological distributions known throughout the world) what is the frequency of individuals of a population corresponding to a certain 'interval' of susceptibility, marked by doses C and D, that is to say, the frequency of individuals which have a sufficient resistance not to react to dose C, but which, however, are sufficiently susceptible to the higher dose D, we must evidently subtract from the percentage of individuals which react to dose D, the percentage of individuals which react to dose C.

Acting thus point by point (dose by dose) and plotting all the values obtained on a diagram, we will have a distribution curve similar to that for height, that is, a differential curve. On the other hand, by plotting directly the percentages obtained gradually with the different doses, we will have an integral curve which is precisely sigmoid form.

From both the theoretical and the practical standpoint, it is preferable to work on the integral curve: consequently for this curve will be adopted data such as they are, taking into account that the sigmoid toxicity curve is the integral curve of distribution of individual resistance.

According to this concept, the doses in abscissa are nothing but the measures of resistances (or individual thresholds).

If we now wish to give an estimation of the activity of a preparation, so as subsequently to compare it with that of others, it is evident that we will have to determine the value of at least two constants: the average value of the individual resistance and a value which indicates the 'density' with which the values which deviate from the average are grouped about it; that is, a measure of dispersion of individual values. This measure is, in general, the standard deviation.

Therefore, LD₅₀, which indicates the dose to which 50 per cent. of the organisms react, has been chosen. Or otherwise said, the average (which in a normal distribution coincides with the arithmetical average) of resistances, expressed as dose of the chemical product.

We have seen that to facilitate the determination of the LD₅₀ of the test material, it is very useful to correct the toxicity curve.

This correction may be effected directly on the ordinate which for the purpose is graduated so that if the percentages obtained during the course of the experiment are plotted directly, they will be arranged as if they had been expressed with corrected unit y . Such is the probability paper in which the abscissa, to make it easier, is logarithmic, so that the determination of the logarithms of the doses is not necessary and they can be plotted directly onto this type of graph paper at an interval of 1 to 10⁴.

On the ordinates the percentages are marked from 0.02 to 99.8 per cent. An important characteristic is that on the graph paper the values from 0 to 100 per cent. cannot be indicated because they remain respectively at $-\infty$ and $+\infty$.

A few words should be added on the signification of the angular coefficient of the curve which is the reciprocal of the average quadratic deviation. *This means to say that the inclination of the toxicity curve depends directly on the variability of the population selected for the determination.* For the same product and the same biological population, whatever the initial concentration of the preparation, a parallel toxicity line is always obtained within the limits of occasional errors. But matters change if the preparation is changed or if the species of fungus examined is changed. On the contrary, it should be observed that, as will be seen further on, varying the fungi and the preparations, curves are often obtained which with ordinary methods cannot be corrected. The determination of the LD₅₀ then becomes particularly difficult.

TOXICITY CURVE FITTING AND IMPORTANCE OF THE ERRORS. USE OF THE GRAPH METHOD.

Thus we have seen how the toxicity curve of a chemical product can be corrected. The successive problem is to trace, for the points corresponding to each experimental datum, a curve which 'distributes them evenly', that is, which represents them as approximate as possible.

Methodological statistics dispose of many methods of curve fitting. The square minima method is classic. To use this and other methods well, however, must be known the 'weight' to be assigned to each point and which varies from point to point chiefly, but not only, in relation to the number of individuals selected for each determination. It is evident that this weight depends, in effect, on the 'precision' with which each special measurement is effected.

Estimating the 'weight' is the most difficult task and it may be said that each of the different methods proposed successively for the fitting of the curve differ essentially in this respect.

PRIGGE obtained a solution of the problem of probabilities 'a posteriori' for the special case which signifies, for the distribution of empiric frequencies, the BERNOULLI formula. Thus, he was able to obtain a formula which gives for specific levels of probability ($k = 1$, probability of 60 per cent.; $k = 2.95$ per cent.; $k = 3.99$ per cent.) the interval within which falls, with the probability given by k , the theoretical frequency. To this interval and to these limits has been given

the name 'fiducial' ('Mutungsbereich' and 'Mutungsgrenzen'). This term is the literal translation of the English 'fiducial interval' and was already previously applied by English investigators.

An examination of the approximation of the formula of PRIGGE as well as of the general method for estimating biological activity of the same investigator made by VAN DER WAERDEN (1939) shows that the PRIGGE method is advisable particularly when, from the test, data follow on a high number of individuals treated with few doses of the product. In reality, this is the case of fungicides.

The values assumed by the fiducial intervals for n from 2 to 500 and for the different empiric frequencies have been tabulated by VON SCHELLING (1939) for $k = 1, 2, 3$, and PRIGGE and SCHAEFER made a graph for $k = 1$; according to PRIGGE, therefore, the determination of the interval of errors does not involve any difficulty or calculation.

The PRIGGE formula is utilized for a new method of determining the importance of each observation (which may also be determined directly by a PRIGGE and SCHAEFER graph for $k = 1$, without any calculation), but which has chiefly the advantage of enabling graphic curve fitting with great facility and accuracy in results; we have designed graphs for $k = 2$.

Thus the error or weight of each point can be known and it is possible to pass to the fitting of the curve and the exact determination of the LD₅₀.

Without going into the different arithmetic methods in use, we will subsequently keep to the explanation of the graphic method of PRIGGE and SCHAEFER (1939).

The experimental data are plotted as is usual on the probability paper as abscissa points equal to the dose (logarithmic scale) and the ordinate equal to the percentage of toxicity. By means of tables and graphs for all the points observed, the limits of error about the experimental point are determined and they are joined by a segment.

The toxicity curve is traced according to approximation criteria; the first, the most common is: the curve is traced in such a way that half of the observations (that is, the points) fall on each side of it. The use of fiducial intervals, however, enables the use of a finer criterium: trace the curve in such a way that it cuts the largest possible number of fiducial intervals and, compatible with this, as near as possible to the true points within each interval.

Thus, in practice a curve is obtained which in the majority of cases differs insignificantly from that distributed equally by analytical means. PRIGGE advises resorting to analytical curve fitting when the curve passes too far from one or several fiducial intervals.

When the toxicity curve is traced, the LD₅₀ is determined immediately. This is but the dose, namely, the abscissa corresponding to the point of the curve which has an ordinate equal to 50 per cent.

LD 50 ERROR AND CORRECTION OF RANDOM SAMPLING ERRORS.

It is important, in order to compare the toxicity of two different fungicides, to know what precision we can assign to the LD₅₀ obtained, so as to establish if the differences of LD₅₀ between different fungicides should be attributed to occasional deviations or if they are based on actual differences in toxicity.

The determination of LD₅₀ error with the PRIGGE graph method is exceedingly simple. First the sum of all the individuals which reacted positively to the different doses is divided by the sum of all the individuals observed: namely, the total number of spores observed. A percentage is thus obtained, and the point which corresponds to it is marked on the curve: also the fiducial interval is determined with n equal to the total number of spores observed, and for the limits of this interval, two parallels to the toxicity curve are traced. These two parallels when they meet the ordinate of 50 per cent. fix the lower and upper limits of LD₅₀ error with the probability corresponding to that of the k level employed. For our work we preferred $k = 2$ (= 95 per cent.), which corresponds to the 19/20 zones of McCALLAN.

There are also other analytical methods which are more difficult to apply. In the case of fungicides, it is easy to note how the errors into which one falls are in reality much higher than the errors expected by calculation.

The cause of these errors is to be sought for in technical difficulties in the extreme variability of the fungi employed, in the necessary dilutions which permit appreciable errors, etc., and especially in the corrections necessary to take into account the spores which do germinate in water and the spores which also resist the strongest concentration of fungicides. It is not astonishing, therefore, that, very frequently, the points present wide deviations compared with the theoretical curve.

Moreover, the error calculated by all the methods described until now does not express the error of random sampling, namely, the error due to the fact that all the statistical data employed are obtained after the observation of a limited number of individuals and only constitute an approximate estimation of the theoretical values which can be obtained by the examination of the whole population. This error should be rigorously distinguished from that due to the inevitable defects of technique, etc.

The zone of error of LD₅₀, therefore, is certainly determined by defective approximation, and it is necessary to correct it in view of the extra errors of random sampling.

WILCOXON and McCALLAN had already become aware of this necessity and had suggested a method based on the use of χ^2 which we will not report here, leaving it to the original and to our more complete study.

CASE OF NON-RECTIFIABLE CURVES: THEORETICAL SIGNIFICATION AND ELABORATION IN THE PRACTICAL FIELD.

The theory of toxicity curves was elaborated for the particular case that they can be corrected by an appropriate change of the abscissae; change which is traditionally that into logarithms.

Experience, however, shows that, in the different cases, according to the biological material and chemical product employed, the toxicity curves on logarithmic probability paper cannot certainly be plotted to a straight line and that two alternatives are possible: a concave curve and a convex curve.

There is no theoretical study of any kind of these curves and the difficulties which this study would encounter are easily seen. None the less, the causes of these deviations can be gauged:—

(1) The biological material examined is not homogeneous; the curve of distribution of resistances is of the plurimodal type and its integral curve on the probability paper presents a very complex convex-concave aspect;

(2) Logarithmic transformation is unsuitable. Unfortunately, this second possibility is of difficult theoretical estimation owing to our ignorance of its significance.

We will discuss this subject more fully in a coming note.

LEGISLATIVE AND ADMINISTRATIVE MEASURES

Italy. — By Ministerial Decree of October 16, 1945 the administration of the General Commissariat for the control of citrus scale in Sicily and in Calabria, with office at Catania, has been subjected to the periodical inspection by a special board of examiners. (*Gazzetta Ufficiale del Regno d'Italia*, Roma, 24 vembre 1945, anno 86°, n. 141, p. 1858).

Switzerland (Vaud Canton). — By Decree of November 8, 1943 the communes are required to report to the canton the damage caused to crops by voles and other field rodents.

The communes may make the destruction of these pests compulsory; they are authorized to organize control operations together in their combined territory. The costs are borne by the farmers benefiting from this campaign.

The canton may make the destruction of field rodents in infested communes compulsory. If necessary for the general welfare, the canton may take over from the commune in organizing control operations. (*Recueil des lois, décrets, arrêtés et autres actes du Gouvernement du Canton de Vaud*, Lausanne, 1944, tome CXL-1943, p. 195-196).

* * * A Decree of July 8, 1944 modifies Article 1 of Decree dated February 1, 1938 (see this *Bulletin* 1939, No. 6, p. 137) relative to the sale of arsenical or other poisonous products intended solely for use in aboriculture, wine-growing, horticulture and agriculture, with the exception of vegetables. (*Ibid.*, 1945, tome CXLI-1944, p. 183-184).

MATERIAL FOR AN EUROPEAN COLORADO BEETLE
BIBLIOGRAPHY *

(continued) †

- FEYTAUD, J[EAN]. Où en sommes-nous avec le doryphore ? *Le Bulletin agricole*, Paris, 1939, 59^e année, n° 1926, p. 21-23.
- FEYTAUD, J[EAN]. Vue d'ensemble sur la question doryphorique. *VII. Internationaler Kongress für Entomologie. Verhandlungen*. Weimar 1939, Bd. IV, S. 2650-2654.
- FEYTAUD, J[EAN]. Le rôle des facteurs naturels dans la dissémination du doryphore en Europe. *VII. Internationaler Kongress für Entomologie. Verhandlungen*. Weimar 1939, Bd. IV, S. 2655-2659.
- FEYTAUD, J[EAN]. Les ennemis naturels du doryphore en Europe. *VII. Internationaler Kongress für Entomologie. Verhandlungen*. Weimar 1939, Bd. IV, S. 2660-2662. Bibliographie, S. 2662.
- FEYTAUD, JEAN. France : Colorado beetle, 1939. *International Bulletin of Plant Protection*, Rome, 1940, Year XIV, No. 6, p. 120.
[Published also in the French edition of this periodical].
- FEYTAUD, J[EAN]. Le doryphore en 1940 et 1941. *Revue de Zoologie agricole et appliquée*, Talence (Gironde), 1941, 40^e année, nos 1-2, p. 13-15.
- FEYTAUD, J[EAN]. La defense contre le doryphore au champ et au jardin. *Revue horticole*, Paris, 1941, 113^e année, n° 2079, p. 369-371.
- FEYTAUD, J[EAN]. Das Auftreten und die Bekämpfung des Kartoffelkäfers in Frankreich 1940. *Nachrichtenblatt für den Deutschen Pflanzenschutzdienst*, Berlin 1941, 21. Jahrg., Nr. 5, S. 33-34.
- FEYTAUD, JEAN. France : Observations on the Colorado beetle (*Leptinotarsa decemlineata*) made in the Bordeaux region in 1941. *International Bulletin of Plant Protection*, Rome, 1942, Year XVI, No. 6, pp. 85-86.
[Published also in the French edition of this periodical].
- FEYTAUD, J[EAN]. Der Stand der Kartoffelkäferfrage in Europa. II. Der Kartoffelkäfer in Frankreich 1941 nach Beobachtungen in Südwesten. *Nachrichtenblatt für den Deutschen Pflanzenschutzdienst*, Berlin 1942, 22. Jahrg., Nr. 6, S. 38-39.
- FEYTAUD, J[EAN]. Les solutions alcalines et le doryphore. *Comptes rendus hebdomadaires des séances de l'Académie d'Agriculture de France*, Paris, 1943, tome XXIX, n° 1, p. 28-29.
- FEYTAUD, J[EAN], BRUNETEAU, J., et DUPOUX, R. Destruction du doryphore par l'oxyde d'éthylène sous vide partiel. *Annales des Epiphyties et de Phytogénétique*, Paris, 1938, nouv. sér., tome IV, fasc. 1, p. 167-198. Bibliographie, p. 198.

* Assembled by GIULIO TRINCHIERI, International Institute of Agriculture.

† See this *Bulletin* 1945, Nos. 9-10, pp. 81-88, Nos. 11-12, pp. 109-112.

- FEYTAUD, J[EAN], et DE LAPPARENT, P[IERRE]. Recherches sur les poudres nicotinées. I. - Leur emploi dans la lutte contre le doryphore. *Comptes rendus hebdomadaires des séances de l'Académie d'Agriculture de France*, Paris, 1941, tome XXVII, n° 12, p. 725-728.
- FEYTAUD, J[EAN], et DE LAPPARENT, P[IERRE]. A propos d'une formule alcaline précônisée pour détruire le doryphore. *Comptes rendus hebdomadaires des séances de l'Académie de France*, Paris, 1942, tome XXVIII, n° 3, p. 229-231.
- FEYTAUD, J[EAN], SCHWARTZ, M[ARTIN], et TROUVELOT, B[ERNARD]. Un exemple de collaboration internationale pour l'étude en commun de la lutte contre le doryphore : la recherche de Solanées résistantes. *Revue de Zoologie agricole et appliquée*, Bordeaux, 1938, 37^e année, n° 5, p. 65-68.
- FRYER, J. C. F. Colorado beetle at Tilbury. *The Journal of the Ministry of Agriculture*, London, 1934, Vol. XLI, No. 10, pp. 907-912, 1 pl.
- FRYER, J. C. F. Colorado beetle at Tilbury. II. *The Journal of the Ministry of Agriculture*, London, 1935, Vol. XLI, No. 11, pp. 1058-1062, 1 map.
- FRYER, J. C. F. Colorado beetle at Tilbury. III. *The Journal of the Ministry of Agriculture*, London, 1936, Vol. XLII, No. 11, pp. 1089-1092.
- GALLWITZ, K. Technische Aufgaben bei der Kartoffelkäfer-Spritzung. *Zeitschrift für Pflanzenkrankheiten (Pflanzenpathologie) und Pflanzenschutz*, Stuttgart 1938, 48. Jahrg., Heft 5, S. 246-252, Abb. 1-4.
- GARCÍA DE OTEYZA, CARLOS. Notas sobre el escarabajo de la patata. *Siembra*, Madrid, 1945, año I, núm. 1, 2 págs., 4 figs.
- GERSDORF, ERASMUS. Über die Ähnlichkeit der Larven des Kartoffelkäfers mit denen des Lilienhähnchens. *Anzeiger für Schädlingskunde*, Berlin 1938, XIV. Jahrg., Heft 4, S. 42-43.
- GILLEN, M. Luxemburg: The Colorado beetle situation during 1939. *International Bulletin of Plant Protection*, Rome, 1940, Year XIV, No. 4, p. 76.
[Published also in the French edition of this periodical].
- GRISON, P. Recherches sur le déterminisme de la sortie printanière du doryphore (*Leptinotarsa decemlineata* Say). *Revue de Zoologie agricole et appliquée*, Bordeaux, 1939, 38^e année, n° 2, p. 26-29, fig. 2.
- GRISON, P. Caractères de la résistance au doryphore, *Leptinotarsa decemlineata* Say, d'un hybride *Solanum demissum* × *Solanum tuberosum*. Comité des Travaux historiques et scientifiques. *Comptes rendus du Congrès des Sociétés savantes de Paris et des Départements tenu à Bordeaux en 1939. Section des Sciences*, Paris, 1939, p. 121-125, 1 fig.
- GRISON, P. Notes écologiques sur le doryphore et éléments pour les pronostics d'invasion qu'elles permettent. VII. *Internationaler Kongress für Entomologie. Verhandlungen*. Weimar 1939, Bd. IV, S. 2663-2668, 1 Abb.
- GRISON, P., et DELOUSTAL, J. Caractères écologiques de l'évolution du doryphore en Bretagne [en] 1942. *Comptes rendus hebdomadaires des séances de l'Académie d'Agriculture de France*, Paris, 1943, tome XXIX, n° 3, p. 111-114.
- GUILLAUME, A. Le pétunia et le doryphora de la pomme de terre. *Revue de Botanique appliquée et d'Agriculture tropicale*, Paris, 1934, 14^e année, bulletin n° 156, p. 659-663. Bibliographie, p. 663.

- HAUPT, W. Wie können wir der Kartoffelkäfer-Gefahr begegnen? *Mitteilungen für die Landwirtschaft*, Berlin 1937, 52. Jahrg., Heft 51, S. 1101-1102, Abb. 1-2.
- HAUPT, W. Versuch zum Studium des Kartoffelkäfers. *Forschungsdienst*, Berlin 1938, Bd. 5, Heft 7, S. 341-343, 4 Abb.
- HAUPT, W. Die Schäden durch den Kartoffelkäfer. *Mitteilungen für Landwirtschaft*, Berlin 1939, 54. Jahrg., Heft 26, S. 589-590, 2 Abb.
- HOFFMANN. Der Koloradokäfer in Frankreich. *Deutsche Landwirtschaftliche Presse*, Berlin 1940, 67. Jahrg., Nr. 41, S. 373, Abb. 506-508.
- HULSENBERG, H. Die Bekämpfung des Kartoffelkäfers. *Natur und Volk*, Frankfurt a. M. 1937, Bd. 67, Heft 8, S. 387-392, Abb. 1-7.
- JACQUES, CHARLES. Notice sur le doryphore. *Revue agricole*, Nouméa, 1939, p. 3419-3422.
- JENNES, J. De Coloradokever. *Onze Ploeg*, Leuven 1932, elfde jaarg., nr 5, blz. 129-135.
- KOMMISSION FÜR DIE FÖRDERUNG DES FELDBAUES, LUXEMBURG. Die Bekämpfung des Kartoffelkäfers im Grossherzogtum Luxemburg während des Jahres 1938. VII. *Internationaler Kongress für Entomologie. Verhandlungen*. Weimar 1939, Bd. IV, S. 2669-2674.
- KOZLOVSKY, S[ERGE]. Le cycle biologique de *Leptinotarsa decemlineata* Say sur différentes variétés de tomate (*Solanum lycopersicum* L.). *Revue de Zoologie agricole et appliquée*, Bordeaux, 1936, 35^e année, n° 7, p. 105-108.
- KOZLOVSKY, SERGE. Sur le décalage des générations de *Leptinotarsa decemlineata* en milieu artificiel. *Annales des Epiphyties et de Phytogénétique*, Paris, 1937, nouv. sér., tome III, fasc. 1, p. 99-111, fig. 1-3.
- LABES, BODO. Wird auch die deutsche Schweinezucht durch den Koloradokartoffelkäfer bedroht? *Zeitschrift für Schweinezucht, Schweinemast und Schweinehaltung*, Neudamm 1932, 39. Jahrg., Nr. 32, S. 523, 1 Abb.
- LACOTTE, H. Ce qu'il faut penser de l'emploi des pétunias comme plantes pièges toxiques dans la lutte contre le doryphore. *Bulletin mensuel de la Société Nationale d'Horticulture de France*, Paris, 1934, 6^e série, tome I, p. 182-184.
- LANEUVILLE, L. Les principales étapes de la lutte contre le doryphore et leur efficacité relative. *L'Agriculture nouvelle*, Paris, 1939, XLIX^e année, n° 1989, p. 5, 1 fig.
- LANGE, E. G. Starkes Auftreten von Kartoffelkäfern an Bittersüßpflanzen. *Nachrichtenblatt für den Deutschen Pflanzenschutzdienst*, Berlin, 1942, 22. Jahrg., Nr. 1, S. 2.
- LANGENBUCH, R. Bericht des Kartoffelkäfer-Abwehrdienstes, Heidelberg. *Nachrichtenblatt für den Deutschen Pflanzenschutzdienst*, Berlin 1936, 16. Jahrg., Nr. 9, S. 85-87, Abb. 1-2; Nr. 11, S. 105-108, Abb. 1-8.
- LANGENBUCH, R. Die Bekämpfung des Kartoffelkäfers in Stade 1934. *Mitteilungen aus der Biologischen Reichsanstalt für Land- und Forstwirtschaft, Berlin-Dahlem*, Berlin 1936, Heft 52, 20 S., 10 Abb.
- LANGENBUCH, [R.]. Massnahmen zur Verhütung der Beschädigung des Kartoffelkrautes durch die Arsenspritzungen gegen den Kartoffelkäfers. *Zeitschrift für Pflanzenkrankheiten (Pflanzenpathologie) und Pflanzenschutz*, Stuttgart 1937, 47. Bd., Heft 2, S. 98-101, Abb. 1-3.

- LEQUERTIER, ROGER. Le doryphore de la pomme de terre. I. *Revue générale d'Horticulture*, Paris, 1932, 10^e année, n° 104, p. 2-4, 2 fig.
- LEQUERTIER, ROGER. Le doryphore de la pomme de terre. II. *Revue générale d'Horticulture*, Paris, 1932, 10^e année, n° 106, p. 33-36, 3 fig.
- LEQUERTIER, ROGER. Le doryphore de la pomme de terre. III. *Revue générale d'Horticulture*, Paris, 1932, 10^e année, n° 107, p. 51-54, 4 fig.
- LEQUERTIER, ROGER. Le doryphore de la pomme de terre. [IV]. *Revue générale d'Horticulture*, Paris, 1932, 10^e année, n° 110, p. 97-99.
- LEQUERTIER, ROGER. Le doryphore de la pomme de terre (Etat actuel de la question). *L'Agriculture nouvelle*, Paris, 1935, XLI^e année, n° 1765, p. 10, 1 carte.
- LESNE, PIERRE. Le doryphore de la pomme de terre. *Journal d'Agriculture pratique*, Paris, 1932, 96^e année, n° 8, p. 153-156, fig. 1-2, 1 pl. en coul.
- LOUNSKY, J., et TILEMANS, EM. Essais sur la résistance du doryphore (*Leptinotarsa decemlineata* Say) aux fumigations à l'acide cyanhydrique. *Bulletin de l'Institut agronomique et des Stations de Recherches de Gembloux*, Gembloux, 1939, tome VIII, n° 1, p. 59-67, fig. 1-2. Bibliographie, p. 66.
[With titles and summaries also in Flemish, Cerman and English].
- M.-M. Le doryphore de la pomme de terre. *Revue générale d'Horticulture*, Paris, 1931, 9^e année, n° 103, p. 1661-1663, 1 fig.
- MAKKUS, W. Kartoffelkäfer-Bekämpfungswersuche mit Kalkstickstoff in Bussièrè-Dunoise (Creuse). *Mitteilungen aus der Biologischen Reichsanstalt für Land- und Forstwirtschaft, Berlin-Dahlem*, Berlin 1938, Heft 58, S. 77-85.
- MAKKUS, W. Kartoffelkäfer-Bekämpfungsversuche mit Kalkstickstoff. VII. *Internationaler Kongress für Entomologie. Verhandlungen*. Weimar 1939, Bd. IV, S. 2675-2684.
- MALENOTTI, ETTORE. La dorifora, un nemico della patata da tener d'occhio. *La Domenica dell'Agricoltura*, Roma, 1938, anno XIII, n. 18, p. 4, 1 fig.
- MALENOTTI, ETTORE. Ancora sulla dorifora della patata. *L'Italia agricola*, Roma, 1939, anno 76, n. 4, pp. 236-238, 1 fig., 1 tav. a col.
- MALLACH, NORBERT. Die Kartoffelkäfer-Gefahr. *Photographie und Forschung*, Dresden 1941, Bd. 3, Heft 8, S. 230-232, 1 Abb., Taf. A.
- MAMELI CALVINO, EVA. Il pericolo dell'invasione della *Doryphora* delle patate. *La Costa Azzurra agricola floreale*, Sanremo, 1937, anno XVII, n. 10, pp. 231-234, 1 fig.
- MAMELI CALVINO, EVA. Nemici in vista: *Doryphora decemlineata* e *Diacrisia purpurata*. *La Costa Azzurra agricola floreale*, Sanremo, 1940, anno XX, nn. 5-6, pp. 52-53.
- MARCHAL, P[AUL]. Sur la lutte contre le doryphora. *Comptes rendus des séances de l'Académie d'Agriculture de France*, Paris, 1923, tome IX, p. 359-360.
- MARCHAL, PAUL. Le doryphora (*Leptinotarsa decemlineata* Say), insecte destructeur de la pomme de terre. *Revue de Zoologie agricole et appliquée*, Bordeaux, 1923, 22^e année, n° 7, p. 177-191.
[Reproduction of the pamphlet edited in 1923 by the Ministry of Agriculture of France].
- MATTRAS, H. La lutte contre le doryphore de la pomme de terre en 1942. *Le agricole Progrès et viticole*, Montpellier, 1942, 59^e année, n° 27, p. 8-10.

- MAYNÉ, R. L'organisation et les travaux du Comité international pour l'étude en commun de la lutte contre le doryphore. *VII. Internationaler Kongress für Entomologie. Verhandlungen*, Weimar 1939, Bd. IX, S. 2685-2689.
- MAYNÉ, R. L'expérience acquise par quatre années d'invasion doryphorique. *VII. Internationaler Kongress für Entomologie. Verhandlungen*, Weimar 1939, Bd. IV, S. 2690-2694.
- MAYNÉ, R. Que faut-il entendre par foyer du doryphore? Dénombrement des foyers. *VII. Internationaler Kongress für Entomologie. Verhandlungen*, Weimar 1939, Bd. IV, S. 2703-2704.
- MAYNÉ, R. Der Stand der Kartoffelkäferfrage in Eusopa. VI. Übersicht über den Stand der Ausbreitung des Kartoffelkäfers in Belgien im Jahre 1941. *Nachrichtenblatt für den Deutschen Pflanzenschutzdienst*, Berlin 1942, 22. Jahrg., Nr. 10, S. 63-64.
- MAGNÉ, R. Belgium: Outbreak of the Colorado potato beetle in the country. *International Bulletin of Plant Protection*, Rome, 1935, Year IX, No. 11, pp. 247-249.
[Published also in the French and Spanish edition of this periodical].
- MAYNÉ, R. Belgium: The Colorado beetle in 1938. *International Bulletin of Plant Protection*, Rome, 1938, Year XII, No. 8, p. 170.
[Published also in the French edition of this periodical].
- MAYNÉ, R. Belgium: The Colorado beetle in 1938. *International Bulletin of Plant Protection*, Rome, 1939, Year XIII, No. 1, pp. 1-2.
[Published also in the French edition of this periodical].
- MAYNÉ, R. Belgium: Predators of the Colorado beetle (*Leptinotarsa decemlineata*). *International Bulletin of Protection*, Rome, 1941, Year XV, Nos 7 & 8, pp. 133-134.
[Published also in the French edition of this periodical].
- MAYNÉ, R. Belgium: A review of the Colorado beetle situation in 1941. *International Bulletin of Plant Protection*, Rome, 1942, Year XVI, No. 1, p. 1.
[Published also in the French edition of this periodical].
- MAYNÉ, R., et BRENIV, R. Prédateurs et parasites du doryphore. *Bulletin de l'Institut agronomique et des Stations de Recherches de Gembloux*, Gembloux, 1940, tome IX, nos. 1-4, p. 61-80, fig. 1, pl. I-II. Bibliographie, p. 77-78.
- MEIER, O. W., und PARFENTJEV, I. A. Die Bekämpfung des Kartoffelkäfers (*Leptinotarsa decemlineata* Say). *Anzeiger für Schädlingskunde*, Berlin 1933, IX. Jahrg., Heft 10, S. 121-123. Literaturverzeichnis, S. 123.
- [MILITÄRBEFEHLSHABER IN FRANKREICH]. Der Stand der Kartoffelkäferfrage in Europa. III. Die Kartoffelkäfer-Bekämpfung im besetzten Gebiet Frankreichs im Jahre 1941. *Nachrichtenblatt für den Deutschen Pflanzenschutzdienst*, Berlin 1942, 22. Jahrg., Nr. 7, S. 45-46.
- MINISTERO DELL'AGRICOLTURA E DELLE FORESTE, ROMA. DIREZIONE GENERALE DELL'AGRICOLTURA. La dorifora, flagello della coltivazione della patata. [Roma, 1938], 2 pp., 1 tav. a col.
[A leaflet of the Royal Observatory for Plant Diseases, Entomological Section, Portici, Italy].
- MINISTRY OF AGRICULTURE. Spain: The Colorado beetle in 1939. *International Bulletin of Plant Protection*, Rome, 1940, Year XIV, No. 6, p. 120.
[Published also in the French edition of this periodical].
- MINISTRY OF AGRICULTURE AND FISHERIES, LONDON. England: The Colorado beetle (*Leptinotarsa decemlineata*). *International Bulletin of Plant Protection*, Rome, 1933, Year VII, No. 10, p. 226.
[Published also in the French and Spanish editions of this periodical].

- MINISTRY OF AGRICULTURE AND FISHERIES, LONDON, England: The Colorado beetle (*Leptinotarsa decemlineata*). *International Bulletin of Plant Protection*, Rome, 1934, Year VIII, No. 3, p. 51.
[Published also in the French and Spanish editions of this periodical].
- MINISTRY OF AGRICULTURE AND FISHERIES, LONDON, England und Wales: New and interesting phytopathological records for the year 1935. *International Bulletin of Plant Protection*, Rome, 1936, Year X, No. 3, pp. 49-50.
[Published also in the French and Spanish editions of this periodical].
- MINISTRY OF FOREIGN AFFAIRS AND FOREIGN COMMERCE OF BELGIUM. International Conference for the mutual study of the control of the Colorado beetle. *International Bulletin of Plant Protection*, Rome, 1936, Year X, No. 4, pp. 77-78.
[Published also in the French and Spanish editions of this periodical].
- MÜLLER, K. O., und SELKE, K[URT]. Über die Aussichten der Züchtung von "käferfesten" Kartoffelsorten. *Mitteilungen aus der Biologischen Reichsanstalt für Land- und Forstwirtschaft, Berlin-Dahlem*, Berlin 1941, Heft 64, S. 10-23, Abb. 1-5.
- MÜLLER, K. O., und SELKE, K[URT]. Beiträge zur Frage der Züchtung kartoffelkäferwiderstandsfähiger Kartoffelsorten. *Zeitschrift für Pflanzenzüchtung*, Berlin 1941, Bd. XXIV, Heft 2, S. 186-228, Abb. 1-13. Schrifttum, S. 227-228.
- MÜLLER-BÖHME, H. Ist die Anwendung arsenhaltiger Insektennmittel für Wild und Geflügel gefährlich? Kann man auf die Hilfe des Federwildes und des Hausgeflügels bei der Bekämpfung des Kartoffelkäfers rechnen? *Zeitschrift für Pflanzenkrankheiten (Pflanzenpathologie) und Pflanzenschutz*, Stuttgart 1936, 46. Bd., Heft 9, S. 439-442.
- NEUWEILER, E. Der Koloradokäfer. Seine Geschichte, Biologie und Bekämpfung. *Landwirtschaftliche Jahrbuch der Schweiz*, Bern 1936, L. Jahrg., Heft 8, S. 795-810, Abb. 1-3. Benützte Literatur, S. 810.
- NEUWEILER, E. Switzerland: The Colorado beetle (*Leptinotarsa decemlineata*) in German Switzerland. *International Bulletin of Plant Protection*, Rome, 1937, Year XI, No. 10, p. 224.
[Published also in the French and Spanish editions of this periodical].
- PAOLI, GUIDO. La dorifora della patata. *L'Italia agricola*, Roma, 1938, anno 75, n. 4, pp. 247-250, figg. 1-2.
- PEETERS, G. A. Aperçu sur la question du doryphore en Belgique. VII. *Internationaler Kongress für Entomologie. Verhandlungen*. Weimar 1939, Bd. IV, S. 2695-2700.
- PEETERS, GUSTAVE, et COUSTRY, ROGER. La lutte contre le doryphore en Belgique. *La Technique agricole internationale*, Rome, 1936, VI^e année, nos 3-4, p. 214-226, fig. 1-7.
- PHYTOPATHOLOGICAL SERVICE. The Netherlands: Outbreak of the Colorado beetle (*Leptinotarsa decemlineata*) in the country. *International Bulletin of Plant Protection*, Rome, 1937, Year XI, No. 10, p. 223.
[Published also in the French and Spanish editions of this periodical].
- PHYTOPATHOLOGICAL SERVICE. The Netherlands: Organization of the control of the Colorado potato beetle, *Leptinotarsa decemlineata*. *International Bulletin of Plant Protection*, Rome, 1937, Year XI, No. 12, pp. 275-276.
[Published also in the French and Spanish editions of this periodical].
- PHYTOPATHOLOGICAL SERVICE. The Netherlands: Outbreak of the Colorado beetle in 1938. *International Bulletin of Plant Protection*, Rome, 1938, Year XII, No. 10, pp. 214-215.
[Published also in the French edition of this periodical].

- PHYTOPATHOLOGICAL SERVICE. The Netherlands: The Colorado beetle (*Leptinotarsa decemlineata*) in 1940. *International Bulletin of Plant Protection*, Rome, 1941, Year XV, No. 6, pp. 116-117.
[Published also in the French edition of this periodical].
- PHYTOPATHOLOGICAL SERVICE. The Netherlands: The Colorado beetle (*Leptinotarsa decemlineata*) in 1941. *International Bulletin of Plant Protection*, Rome, 1942, Year XVI, No. 4, p. 49.
[Published also in the French edition of this periodical].
- PHYTOPATHOLOGICAL SERVICE. The Netherlands: The Colorado beetle (*Leptinotarsa decemlineata*) in 1942. *International Bulletin of Plant Protection*, Rome, 1943, Year XVII, Nos. 7 & 8, p. 108.
[Published also in the French edition of this periodical].
- POISSON, R., et PATAY, R. Sur quelques modalités de la régénération des pattes et des ailes chez le larve du doryphore: *Leptinotarsa decemlineata* Say (Coléoptère Chrysomélide). *Comptes rendus des séances de la Société de Biologie et de ses filiales et associées*, Paris, 1938, tome CXXIX, n° 25, p. 126-128.
- POISSON, R., et PATAY, R. A propos des éléments figurés du sang du doryphore, *Leptinotarsa decemlineata* Say (Coléoptère Chrysomélide). *Comité des Travaux historiques et scientifiques. Comptes rendus du Congrès des Sociétés savantes de Paris et des départements tenu à Bordeaux en 1939. Section des Sciences*, Paris, 1939, p. 101-108, fig. 1. Bibliographie, p. 107-108.
- PRAXA, KARL. Im Kampf gegen einen Käfer. *Der deutsche Landwirt*, Prag 1938, 57. Jahrg., Folge 4, S. 49-50, 3 Abb.
- R. Un temibile nemico della patata: la dorifora. *Pagine Agricole*, Livorno, 1938, anno XXII, n. 4, p. 5.
- RAUCOURT, [M.]. Observations sur les produits utilisés en 1935 dans la lutte contre la doryphore. *Comptes rendus hebdomadaires des séances de l'Académie d'Agriculture de France*, Paris, 1935, tome XXI, n° 29, p. 1111-1116.
- RAUCOURT, M. La détermination des doses toxiques de certains produits envers le doryphore. *Annales des Epiphyties*, Paris, 1941, nouv. sér., tome VII, fasc. 2, p. 129-133, 1 fig.
- RAUCOURT, M. et BÉGUÉ, H. Les produits antidoryphoriques en 1941 et 1942. *Comptes rendus hebdomadaires des séances de l'Académie d'Agriculture de France*, Paris, 1942, tome XXVIII, n° 8, p. 380-382.
- RAUCOURT, M., et BÉGUÉ, H. Etude sur les produits utilisés en France contre le doryphore. Monographie publiée par les Stations et Laboratoires de Recherche agronomique. Paris, 1943, 115 p., 34 fig., 4 pl.
- RAUCOURT, M., et TROUVELOT, B[ERNARD]. Recherches sur les constituants des feuilles de *Solanum tuberosum* déterminant l'alimentation des larves de *Leptinotarsa decemlineata*. *Comptes rendus hebdomadaires des séances de l'Académie des Sciences*, Paris, 1933, tome 197, n° 20, p. 1153-1154.
- RAUCOURT, M., et TROUVELOT, B[ERNARD]. Les principes constituants de la pomme de terre et le doryphore. Réactions d'ordre sensitif chez la larve. *Annales des Epiphyties et de Phytogénétique*, Paris, 1936, nouv. sér., tome II, fasc. 1, p. 51-98, fig. 1-11.
- RAUCOURT, M., et TROUVELOT, B[ERNARD]. Essais de poudrage au fluosilicate de baryum contre le doryphore. *Revue de Pathologie végétale et d'Entomologie agricole de France*, Paris, 1937, tome XXIV, fasc. 1, p. 57-69, graphiques I-IV.
- RAUCOURT, M., TROUVELOT, B[ERNARD], et BÉGUÉ, H. L'essai d'efficacité des produits antidoryphoriques. *Annales des Epiphyties et de Phytogénétique*, Paris, 1939, nouv. sér., tome V, fasc. 1, p. 51-83, fig. 1-10.

- RAUCOURT, M., TROUVELOT, B[ERNARD], et VÉZIN, CH. La lutte contre le doryphore en 1942. *Comptes rendus hebdomadaires des séances de l'Académie d'Agriculture de France*, Paris, 1942, tome XXVIII, n° 11, p. 440-441.
- RENARD, P. Les différents appareils utilisés dans la lutte contre le doryphore. *La Vie agricole et rurale*, Paris, 1936, 25^e année, n° 4, p. 53-56, fig. 1-8.
- RINGELMANN, [MAX]. Au sujet du matériel pour la lutte contre le doryphora. *Comptes rendus des séances de l'Académie d'Agriculture de France*, Paris, 1923, tome IX, p. 336-339.
- ROHRBACH, FRITZ. Der Kartoffelkäfer (*Leptinotarsa decemlineata*) in Deutschland. *Natur und Volk*, Frankfurt a. M. 1940, 70. Bd., Heft 2, S. 90-94, Abb. 1-8.
- RONDELEUX, R. Le doryphore. *L'Agriculteur pratique*, Paris, 1938, 102^e année, n° 14, p. 485-486.
- † ROOS, K. Der Stand der Kartoffelkäferfrage in Europa. IV. Das Auftreten des Kartoffelkäfers in der Schweiz im Jahre 1941. *Nachrichtenblatt für den Deutschen Pflanzenschutzdienst*, Berlin 1942, 22. Jahrg., Nr. 8, S. 49-51, 1 Karte.
- SCHAPER, PAUL. Das Verhalten verschiedener Wildspezies gegen den Kartoffelkäfer. *Mitteilungen aus der Biologischen Reichsanstalt für Land- und Forstwirtschaft, Berlin-Dahlem*, Berlin 1938, Heft 58, S. 55-60.
- SCHAPER, PAUL. Das Verhalten der wichtigsten Kultursorten gegen den Kartoffelkäfer im freier Befall. *Mitteilungen aus der Biologischen Reichsanstalt für Land- und Forstwirtschaft, Berlin-Dahlem*, Berlin 1938, Heft 58, S. 61-67.
- SCHAPER, [PAUL]. Arbeiten und Probleme zur züchterischen Bekämpfung des Kartoffelkäfers. *Zeitschrift für Pflanzenzüchtung*, Berlin 1939, Bd. XXIII, Heft 2, S. 239-322, 23 Abb., Schrifttum, S. 290; Heft 2, S. 454-475, 4 Abb.
- SCHÉLBE. Zwei Jahre Kartoffelkäferbekämpfung in Frankreich. *Deutsche Agrarpolitik*, Berlin 1943, Jahrg. 1, Nr. 7/8, S. 254.
- SCHNEIDER, G., und SIEGWARDT, W. Wirkung des bei der blinden Kartoffelkäferbekämpfung in den Boden gebrachten Neutralöls auf das Wachstum der nachgebauten Kulturpflanzen. *Nachrichtenblatt für den Deutschen Pflanzenschutzdienst*, Berlin 1927, 7. Jahrg., Nr. 1, S. 4-5, 1 Abb.
- SCHULTZ, HELMUT. Über die Eignung verschiedener Solanaceen als Nährpflanzen des Kartoffelkäfers. Sammelreferat. *Nachrichtenblatt für den Deutschen Pflanzenschutzdienst*, Berlin 1936, 16. Jahrg., Nr. 3, S. 25-27, Abb. 1-3. Literatur, S. 27.
- SCHWARTZ, [MARTIN]. Der Stand der Ausbreitung des Kartoffelkäfers in Frankreich im Herbst 1925. *Nachrichtenblatt für den Deutschen Pflanzenschutzdienst*, Berlin 1927, 7. Jahrg., Nr. 1, S. 1-3, 3 Karten.
- SCHWARTZ, [MARTIN]. Stand der Kartoffelkäferfrage in Frankreich zur Beginn des Sommers 1927. *Nachrichtenblatt für den Deutschen Pflanzenschutzdienst*, Berlin 1927, 7. Jahrg., Nr. 11, S. 107-109, 1 Karte.
- SCHWARTZ, MARTIN. Das Auftreten des Kartoffelkäfers in England 1933. *Nachrichtenblatt für den Deutschen Pflanzenschutzdienst*, Berlin 1934, 14. Jahrg., Nr. 4, S. 38-40, 1 Karte.
- SCHWARTZ, MARTIN. Auftreten und Bekämpfung des Kartoffelkäfers in Stade. *Nachrichtenblatt für den Deutschen Pflanzenschutzdienst*, Berlin 1934, 14. Jahrg., Nr. 8, S. 73-75.

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